

THE CORRELATION BETWEEN PHYSICAL ACTIVITY AND BLOOD PRESSURE PROFILE IN HYPERTENSIVE PATIENTS AT MEDIA FARMA CLINIC, SAMARINDA

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ABSTRACT

Hypertension is a condition when the systolic blood pressure is ≥ 140 mmHg and/or the diastolic blood pressure is ≥ 90 mmHg when rechecked two to three times with an interval of one to four weeks. There are modifiable and non-modifiable risk factors for hypertension. Good and regular physical activity can effectively manage blood pressure among individuals with hypertension. This study aims to find the correlation of physical activity with blood pressure profile hypertension patients at Media Farma Clinic in Samarinda. The design of this study was analytical and the method employed was cross-sectional approach. Hypertensive patients at Media Farma Clinic in Samarinda were purposively selected as research samples. There were 66 data used in this study. The bivariate analysis utilizing the Chi-Square test was used to test the hypothesis and revealed the following results: the correlation between physical activity and blood pressure profile ($p=0.018$). Conclusion, the study's findings indicate a correlation between physical activity and blood pressure profile.

Keywords : Physical Activity, Blood Pressure, Hypertension

INTRODUCTION

Hypertension is a condition in which systolic blood pressure is ≥ 140 mmHg and/or diastolic blood pressure is ≥ 90 mmHg when checked two to three times at intervals of one to four weeks.¹

The World Health Organization (WHO) estimates that 1.28 billion adults aged 30 to 79 suffer from hypertension, with 46% of sufferers unaware that they have hypertension. Based on the results of the Indonesian Ministry of Health's Basic Health Research, the prevalence of hypertension in Indonesia, as diagnosed by doctors in people aged 18 years and above, increased from 25.8% in 2013 to 34.1% in 2018. Based on data from the East Kalimantan Health Office, the number of people aged 15 and above with hypertension was 5.37% in 2021 and doubled in 2022 to 11.38%.^{2,3,4}

Hypertension has controllable and uncontrollable risk factors. Controllable risk factors include obesity, lack of physical activity, smoking, alcohol consumption, and daily sodium intake. Uncontrollable risk factors include genetics, gender, race, and age. Regular physical activity trains

peripheral resistance and heart muscles, lowers norepinephrine and renin levels, and burns fat in the blood vessels, thereby increasing the diameter of the arteries and improving blood flow.^{5,6}

The WHO recommends that individuals aged 18-64 and patients with hypertension engage in moderate physical activity for 50-300 minutes or vigorous physical activity for 75-150 minutes per week, or a combination of both.⁷

Blood pressure profiles are blood pressure values recorded in the medical records of hypertensive patients, categorized as controlled and uncontrolled blood pressure. Blood pressure is considered controlled in individuals aged 18-64 years if it is 120/70-130/80 mmHg, and in individuals aged ≥ 65 years if it is $< 140/90$ mmHg.⁸

Based on the results of research on the relationship between physical activity and blood pressure in hypertensive patients at Muhammadiyah Hospital in Palembang, a probability value (P-value) of 0.003 was obtained, indicating that there is a relationship. In contrast, research on the relationship between physical activity and

blood pressure in students at the Faculty of Medicine, HKBP Nommasen University in Medan obtained a P-value of 0.240, indicating that there is no relationship.^{9,10}

This study was conducted at the Media Farma Clinic in Samarinda because it has advantages over other primary health facilities. This clinic has a chronic disease management program room and its own laboratory, allowing for more focused services and making it easier for patients to undergo routine laboratory tests. Hypertension patients at this clinic also receive weekly exercise facilities, monthly health education, and routine laboratory tests. Routine laboratory tests include total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, microalbumin, urea nitrogen (BUN), and creatinine. Additionally, the clinic has archived medical records and its own online database, Doctor Tool, which provides comprehensive records of patients' health progress.

This study aims to determine the categories of physical activity and blood pressure profiles of hypertensive patients and to determine the relationship between physical activity and blood pressure profiles of hypertensive patients at the Media Farma Clinic in Samarinda. Based on the above description, it is necessary to conduct research on the relationship between physical activity and blood pressure profiles of hypertensive patients. Research on the relationship between physical activity and blood pressure profiles of hypertensive patients at the Media Farma Clinic in Samarinda has not been conducted, so the results of this study are expected to provide additional information and raise public awareness of the importance of regular physical activity in controlling blood pressure to avoid complications that can lead to death.

MATERIALS AND METHODS

This study is an analytical study using a cross-sectional approach, which is a study that conducts an analysis to determine the relationship between physical activity and blood pressure profiles of hypertensive patients at the Media Farma Clinic in Samarinda. Data collection took place in the chronic disease management program room at the Media

Farma Clinic in Samarinda from December 2023 to March 2024. The sample in this study consisted of hypertensive patients who underwent routine check-ups at the Media Farma Clinic in Samarinda. The sample size used in this study was calculated using the sample size formula for cross-sectional analytical studies using the Lameshow formula, resulting in a required sample size of 66 patients.¹¹

Sampling in this study was conducted using non-probability sampling with purposive sampling technique, which is a sampling technique based on certain characteristics, properties, or traits in accordance with inclusion and exclusion criteria. The inclusion criteria in this study were patients diagnosed with hypertension based on the 2021 Hypertension Consensus classification, patients aged ≥ 18 years, and hypertensive patients who had undergone treatment for ≥ 3 months. The exclusion criteria in this study were patients with diabetes mellitus, chronic kidney failure, coronary heart disease, heart failure, stroke, atrial fibrillation, and lower limb arterial disease.¹²

Physical activity data was obtained directly by interviewing hypertensive patients using the Global Physical Activity Questionnaire (GPAQ) instrument, and data in the form of patient blood pressure profiles was obtained from the medical records of the patients interviewed.

The GPAQ is a physical activity research instrument with a validity score of 0.48 and an instrument reliability score of 0.67-0.73. The GPAQ is used to measure physical activity in developing countries. The advantages of the GPAQ questionnaire compared to other physical activity questionnaires are that the questions are focused and concise on physical activities such as work, transportation, and recreation, making them relevant for use in various situations. In addition, the GPAQ questionnaire has high credibility and has been standardized internationally.^{13,14}

The GPAQ questionnaire has 16 questions on physical activity, covering activities at work, walking, recreational activities, and leisure time. Physical activity scores measured from the GPAQ questionnaire are based on METs (Metabolic Equivalents), which is the metabolic rate during work as a ratio of the metabolic rate at rest in kcal/kg/hour.

$$\text{MET minutes/week} = [(P2 \times P3 \times 8) + (P5 \times P6 \times 4) + (P8 \times P9 \times 4) + (P11 \times P12 \times 8) + (P14 \times P15 \times 4)]$$

Figure 1. Formula for calculating the GPAQ questionnaire physical activity score.

Based on the GPAQ questionnaire, physical activity is categorized into three levels: high (≥ 3000 METs), moderate (600-2999 METs), and low (< 600 METs).¹⁵

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Table 1. Characteristics of the research sample

Characteristics	Frequency	Percentage
Age		
18 to 64 years old	47	71,2%
≥ 65 years old	19	28,8%
Gender		
Male	23	34,8%
Female	43	65,2%
Work		
Housewife	32	48,5%
Teacher	2	3%
Civil Servant	6	9,1%
Private Sector Employees	6	9,1%
Entrepreneur	2	3%
Unemployed	18	27,3%
Aktivitas Fisik		
Low	16	24,2%
Moderate	34	51,5%
High	16	24,2%
Blood Pressure Profile		
Controlled	19	28,8%
Uncontrolled	47	71,2%

Table 1. Shows the characteristics of the research sample of hypertensive patients at the Media Farma Clinic in Samarinda. Patient age characteristics were divided into two categories: 18-64 years and ≥ 65 years. The majority of patients were aged 18-64 years, totaling 47 patients (71.2%), while 19 patients (28.8%) were aged ≥ 65 years. Gender characteristics were divided into female and male, with the majority of patients being female, totaling 43 patients (65.2%), and the rest being male, totaling 23 patients (34.8%).

Based on the results of this study, the majority of patients worked as housewives (32 patients, 48.5%), were unemployed (18 patients, 18%), were civil servants (6

patients, 9.1%), were private sector employees (6 patients, 9.1%), were teachers (2 patients, 3%), and entrepreneurs, 2 patients (3%). The distribution of physical activity among hypertensive patients at the Media Farma Clinic in Samarinda shows that most patients have moderate physical activity, with 34 patients (51.5%), while the rest of the patients have low physical activity, with 16 patients (24.3%), and high physical activity, with 16 patients (24.3%). Additionally, the blood pressure profile of hypertensive patients showed that most patients had uncontrolled blood pressure, with 47 patients (71.2%), and controlled blood pressure, with 19 patients (28.8%).

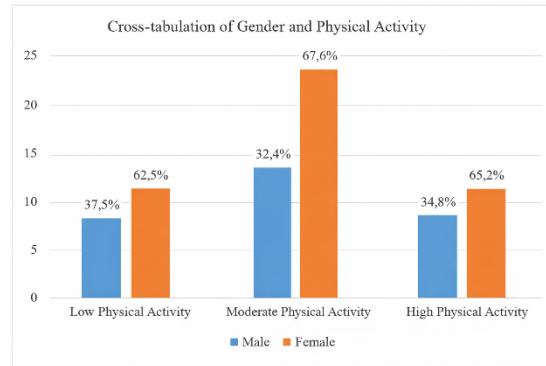


Figure 2. Cross-tabulation graph between gender and physical activity

Figure 2. shows moderate physical activity as the most common activity in the physical activity category data and most commonly performed by female patients.

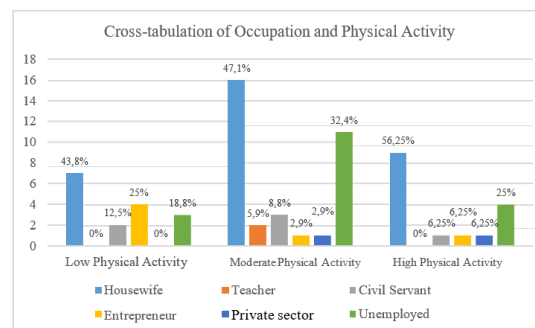


Figure 3. Cross-tabulation chart between occupation and physical activity

Figure 3. shows moderate physical activities that are most commonly performed in the physical activity category data and most commonly performed by patients whose occupation is housewife.

Table 2. Analysis of the correlation between physical activity and blood pressure profile

Physical Activity	Blood Pressure Profile		P	LR
	Uncontrolled	Controlled		
Low	14 (29,8%)	2 (10,5%)	0,018	1
Moderate	19 (40,4%)	15 (78,9%)		
High	14 (29,8%)	2 (10,5%)		

Table 2. Shows the results of the hypothesis test of the correlation between physical activity and blood pressure profile conducted using the Chi-Square test, with a significance value (p-value) of 0.018 ($p < 0.05$). These results indicate that there is a correlation between physical activity and blood pressure profiles in hypertensive patients at the Media Farma Clinic in Samarinda. The Logistic Regression test results obtained a value of 0.181 for the effect of moderate physical activity on blood pressure profiles with low physical activity as a reference and a value of 1 for the effect of high physical activity on blood pressure profiles with low physical activity as a reference.

DISCUSSION

Based on Figures 2 and 3, the researchers found that most patients who had moderate physical activity were predominantly female housewives who had daily activities such as washing clothes, ironing, sweeping, mopping, cleaning the yard, going to the market, cooking, washing dishes, and other housework activities.

Based on the results of the Chi-Square statistical test in Table 2, a significance value (p-value) of 0.018 ($p < 0.05$) was obtained. The results of the Logistic Regression test obtained a value of 0.181 for the effect of moderate physical activity on blood pressure profile with low

physical activity as a reference and a value of 1 for the effect of high physical activity on blood pressure profile with low physical activity as a reference. This indicates that there is a correlation between physical activity and the blood pressure profile of hypertensive patients. Moderate physical activity will reduce the risk of uncontrolled hypertension by 81.9% compared to low physical activity. Meanwhile, high physical activity does not reduce the risk of uncontrolled hypertension compared to low physical activity. These results are in line with previous studies, which found a correlation between physical activity and the incidence of hypertension with a p-value of 0.001.¹⁶

Hypertensive patients experience positive effects from regular physical activity, with a reduction in systolic and diastolic blood pressure of 5 to 7 mmHg. This is due to regular physical activity strengthening the heart muscle and peripheral resistance to avoid blood pressure spikes through vasodilation of blood vessels and smoothing blood flow by burning fat in the heart's blood vessels. Physical activity also plays a role in reducing norepinephrine, renin, and systemic vascular resistance levels, thereby increasing the diameter of arterial blood vessels.¹⁷

Low physical activity can increase the risk of being overweight and increase the risk of hypertension. When physical activity is insufficient, it causes the heart rate to increase, forcing the heart muscle to contract more strongly. The harder and more frequently the heart muscle has to pump, the greater the pressure placed on the arteries, which can increase blood pressure.¹⁸

High-intensity physical activity does not reduce the risk of uncontrolled hypertension compared to low-intensity physical activity, in line with other studies that recommend high-intensity exercise 2-3 times a week. High-intensity exercise more than three times a week does not provide additional benefits for lowering blood pressure. High physical activity in the long term and continuously can increase the risk of hypertension in young and middle age because it can cause hardening of the large artery walls and damage to the heart muscle and coronary arteries.^{19,20,21}

CONCLUSION AND RECOMMENDATIONS

There is a correlation between physical activity and blood pressure profiles of hypertensive patients at the Media Farma Clinic in Samarinda.

Patients with hypertension are expected to consistently engage in moderate physical activity on a regular basis, as it has a positive effect on lowering blood pressure.

FUNDING, CONFLICT OF INTEREST, AND RESEARCH ETHICS

The entire research process, from planning, data collection, analysis, and report preparation, was conducted independently. Thus, there was no influence from any party

that could affect the objectivity and independence of the research results.

This study has no conflicts of interest. The study was conducted solely for scientific purposes and to develop knowledge about the correlation between physical activity and blood pressure profiles in hypertensive patients at the Media Farma Clinic in Samarinda.

This study was conducted in accordance with the principles of health research ethics. All research subjects were given an explanation of the objectives, procedures, benefits, and voluntary participation with written consent (informed consent). The confidentiality of respondents' identities and personal data was fully maintained and used only for research purposes. This study also obtained permission from the Media Farma Samarinda Clinic prior to data collection.

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